SIGNAL CORPS ENGINEERING LABORATORIES
SQUIER SIGNAL LABORATORY
FORT MONMOUTH, N.J.

FMSCL-SPS

Excerpt from Power Memo. #124
Dated 13 June 1949

MEMORANDUM FOR: Chief, Technical Staff, SSL.

S U B J E C T : Report of Trip to McCulloch Motors Corp., Los Angeles, Cal., Diesel Pump & Elect. Mfg. Co., Culver City, Cal., [redacted] STAT , Los Angeles, Cal., Ill. Inst. of Tech., Chicago, STAT Ill., Armour Research Found, Chicago, Ill., and Maynor Research Found., Chicago, Ill.

1. The writer visited the [redacted] STAT Santa Monica, Cal., in connection with the development of the small portable 25 watt engine driven power unit which is being considered by the Army Air Forces, Watson Laboratories, and by Evans and Coles Signal Laboratories for special applications. The small power unit, which is being developed [redacted] 25X1 , Los Angeles, Cal., is described 25X1 as follows:

a. The engine is a very small 2 stroke semi-diesel unit with 1/2" bore and 1/2" stroke and .098 cubic inch displacement, operating at a speed of 8000 rpm. Ignition is obtained by using a hot wire platinum plug. The small platinum wire coil is used instead of the conventional spark plug electrodes. On the bench mounted experimental unit a 3 volt dry cell was used to heat the platinum wire for starting. After the engine started no further use of the battery was required. On the developmental model electrical energy will be taken from the generator during hand-cranking operation to heat the platinum hot wire plug for starting. This circuit is automatically disconnected from the generator after the engine starts, and the heat of compression plus the catylitic activity of the fuel on the platinum wire is all that is required for ignition and continued operation.

b. A special fuel composed of Metro Methane, Methenol, Mesitile oxide and other compounds are used. Information as to what the other compounds are was not available, nor the proportions of the mixture. This was held as a trade secret.

c. A special synthetic lubricant was being used. Upon 135, produced by Union Carbide Company. This lubricant is not available commercially, however, it can be obtained for experimental use only from the Union Carbide Company.

d. The special carburetor was designed and developed for the engine by the [redacted] using unitized control. The experimental STAT unit started very easily and performed well.

e. The generator being used is a small two pole permanent magnet generator being manufactured by the Indianan Steel Products Co. [redacted] STAT , also the [redacted] S STAT are not too well pleased with the design.

C O P Y

Excerpt from Power Memo. #184, dd 13 June 49 (con't)

f. A new development model is being made at the present time which they expect to have completed in approximately 45 days. It will be approximately 4-1/2" x 4-1/2" x 6", a completely encased unit, incorporating the complete power unit. A two position folding hand crank, and gear train, are also incorporated in the unit. The handcrank has two positions, one for cranking the engine thru a centrifugal clutch, and in the other position the crank can be used to drive the generator thru a gear train, thus enabling the unit to be used as a hand cranked generator in case the engine fails, or in case the fuel supply is exhausted. The estimated weight of this unit will be between 3 and 4 pounds. 25X1

g. The new unit being developed will have an engine speed of 1000 rpm., and is being made for long life operation. It is being developed for the Navy Electronics Laboratories, who requested 5000 hours continuous automatic unattended operation at 10 watts constant output. The development company doubts that such life can be obtained, however, they expect the unit will give at least 2000 hours of continuous operation. The application of the unit is for unattended weather stations for Navy Electronics Laboratories. Most of the engine parts were completed. A sleeved cylinder was being used, made of Meehanite and the piston was made of the same material. No piston rings are used on the piston as they are working to very close tolerances. The Technical Development Co. contemplates using synthetic sapphire for the pistons of these small engines to increase the operating life of the engine providing the present material now being used proves unsatisfactory for long life operation. The connecting rod is made of forged 75 ST dural.

h. The connecting rod bearing will be a ball bearing using conical shaped ball rail in the bearing which will give a 4 point ball contact on the rod and crank pin. The engine is a precision built unit from start to finish, and the workmanship is of the highest quality. The Technical Development Co. is staffed with high quality engineers. Their equipment is excellent. The workmen are highly trained, precision individuals. Everything produced is checked with precision gauges and instruments with which the company is well equipped. The new development model, when completed, will be brought to these laboratories for a demonstration.

/s/ [redacted] STAT
Chief, Power Branch, SSL

C O P Y